ABSTRACT

A method and apparatus performing blind source separation using frequency-domain normalized multichannel blind deconvolution. Multichannel mixed signals are frames of N samples including r consecutive blocks of M samples. The frames are separated using separating filters in frequency domain in an overlap-save manner by discrete Fourier transform (DFT). The separated signals are then converted back into time domain using inverse DFT applied to a nonlinear function. Cross-power spectra between separated signals and nonlinear-transformed signals are computed and normalized by power spectra of both separated signals and nonlinear-transformed signals to have flat spectra. Time domain constraint is then applied to preserve first L cross-correlations. These alias-free normalized cross-power spectra are further constrained by nonholonomic constraints. Then, natural gradient is computed by convolving alias-free normalized cross-power spectra with separating filters. After the separating filters length is constrained to L, the separating filters are updated using the natural gradient and normalized to have unit norm. Terminating conditions are checked to determine if separating filters converged.